

THOMAS WALTER'S OAKS FROM THE COASTAL
REGION OF SOUTH CAROLINA

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ABSTRACT. Thomas Walter was the first post-Linnaean author of a sizable flora in eastern North America. As such, the *Flora Caroliniana* is an important landmark in the botanical history of the United States. This paper is intended to be the first of a series of commentaries on the plants included in Walter's *Flora Caroliniana*. The present paper analyzes the thirteen species of oak (*Quercus*) reported by Walter as occurring in the approximately fifty square miles surrounding his plantation on the south bank of the Santee River some 45 miles northwest of Charleston. Walter's thirteen oak binomials with their current equivalents are as follows: (1) *Q. sempervirens* Walter = *Q. virginiana* Mill.; (2) *Q. phellos* L. = *Q. phellos* L.; (3) *Q. humilis* Walter non Mill. = *Q. incana* W. Bartram; (4) *Q. pumila* Walter [There is no type specimen and the brief description is in flagrant conflict with the species that has borne the binomial for the past 213 years. A new species (*Q. elliottii*) is proposed to replace the misapplied name of Walter]; (5) *Q. prinus* L. [a previously suggested "ambiguous name" soon to be formally proposed for rejection; Walter's plant is *Q. michauxii* Nutt.]; (6) *Q. nigra sensu* Walter, non L. = *Q. marilandica* Münchh.; (7) *Q. aquatica* Walter = *Q. nigra* L.; (8) *Q. rubra sensu* Walter, non L. = *Q. falcata* Michx.; (9) *Q. laevis* Walter = *Q. laevis* Walter; (10) *Q. alba* L. = *Q. alba* L.; (11) *Q. lyrata* Walter = *Q. lyrata* Walter; (12) *Q. sinuata* Walter [identity uncertain]; (13) *Q. villosa* Walter = *Q. stellata* Wangenh.

Key Words: *Quercus*, South Carolina

Among the accomplishments of Thomas Walter (c. 1740–1789), emigrant from England, American patriot, South Carolina planter, merchant, community leader, and landowner (4500 acres), to list merely a sample, was the flora describing in Latin the plants found in the vicinity of his plantation (Rembert 1980). Walter sent his manuscript *Flora Caroliniana* for publication in England with his friend, the itinerant plantsman John Fraser (1750–1811). Botanists are probably not exhibiting undue parochialism in concluding that Walter's principal claim to fame rests upon his *Flora Caroliniana* (1788) and that John Fraser's greatest contribution in all likelihood is in encouraging Walter to bring his floristic investigations to completion as well as providing hun-

dreds of species for inclusion in the *Flora* that otherwise were unknown to Walter. Walter's *Flora* was the first descriptive account of a specific area prepared by a resident of eastern North America appearing after what is accepted as the starting point of botanical binomial nomenclature by Linnaeus in his *Species Plantarum* (1753). Fraser (1789) oversaw the publication of this manuscript in London and indicated that he had added 420 species, making the total 1060 species treated in *Flora Caroliniana*. There is no information to my knowledge as to whether (1) Walter and Fraser jointly studied these botanical discoveries from Fraser's wider exploration and together agreed upon their inclusion, or (2) Walter alone drew up the diagnoses, or (3) the inclusions are the result of only Fraser's study and incorporation into the manuscript after he had left South Carolina. The third possibility seems the least likely. In any event, all new binomials and genera published in *Flora Caroliniana* have been attributed only to Thomas Walter.

Unfortunately Fraser's contribution introduced uncertainty as to the area covered by *Flora Caroliniana*, for Fraser traveled widely in search of horticultural subjects while Walter stated, in the preface of the *Flora* (Rembert 1980), that all but a few of the plants came from an area no greater than 50 square miles centered on his plantation on the south bank of the Santee River in northwestern Berkeley County near the village of St. Stephen's, about 45 miles north of Charleston. It is impossible to determine from the contents of the *Flora* if all, or at least most, of the species contributed by Fraser also came from this small area. We certainly know that some species included did not come from the area designated by Walter. Obvious examples would be *Magnolia acuminata* (L.) L. (widespread in eastern North America) and *M. fraseri* Walter, both included in Walter's *Flora* but known only from the mountains of the Carolinas and adjacent montane states. Other examples that must owe their inclusion to Fraser's travels are *Trautvetteria caroliniensis* (Walter) Vail (Ranunculaceae) and *Frasera caroliniensis* Walter (Gentianaceae). Harper (1911) listed twenty-four species included in Walter's *Flora* that probably did not "grow within many miles of his home . . . and a few that probably have not been seen in South Carolina at all . . ." More intensive collecting over the past nine decades has very much reduced Harper's list but there still remain a number of species which are not known from the coastal plain of South Carolina and in all probability never grew there.

Thirteen species of oaks are briefly described in Walter's *Flora Caroliniana*, eight of which were first published in that publication in the belief that they were unknown to science, as indicated by their being printed in italics. (Perhaps it should be noted that in practice, Walter's use of italics was not consistent.) The fate or disposition of all 13 oak binomials included by Walter is discussed in the following paragraphs. Each entry in Walter's *Flora* under the generic name consists of three parts: (1) the specific epithet or what Linnaeus referred to as the trivial name, (2) the species number under each genus, and (3) the Latin diagnosis of the species. Ashe (1916), who had much interest in and experience with the southeastern oaks, concluded that considering the brevity of Walter's descriptions "they are excellent, but each must be considered in connection with the others he describes." The late, astute and careful Howard Rock (1925–1964) noted (1956) that Walter's descriptive phrases, if rearranged, amounted to a brief key to the species in each genus.

***sempervirens* 1. foliis lanceolatis perennantibus integerrimus margine subrevoluto.** All commentators noted for the past two centuries are agreed that *Quercus sempervirens* Walter (1788) is a later synonym of *Q. virginiana* Mill. (1768).

Quercus virginiana Mill., Gard. Dict., ed. 8, *Quercus* no. 16. 1768.

Q. phellos [var.] β L., Sp. Pl. 994. 1753.

Q. sempervirens Walter, Fl. Carol. 234. 1788, non Mill., 1768.

Q. virens Sol. in Aiton, Hortus Kew. 3: 356. 1789.

Q. andromeda Riddell, New Orleans Med. Surg. J. 9: 614. 1853.

Q. virginiana var. *virescens* Sarg., Bot. Gaz. 65: 446. 1918.

Q. virginiana var. *eximea* Sarg., Bot. Gaz. 65: 447. 1918.

Q. virginiana var. *macrophylla* Sarg., Bot. Gaz. 65: 447. 1918.

Q. eximea (Sarg.) Trel., Mem. Natl. Acad. Sci. 20: 116. 1924.

Phellos 2. foliis deciduis lanceolatis integerrimis seta terminatis. The willow oak is abundant in Berkeley County, South Carolina, so we can be confident that it was well known to Walter. However, it seems certain that he may well have compounded with it other similar species that are also frequent in the area, such as *Quercus laurifolia* Michx. and perhaps *Q. hemisphaerica* W. Bartram ex Willd. The last two mentioned oaks are apparently frequent in Walter's area but he obviously did not differentiate them from one another, which is understandable considering that

only in the past half century have botanists made much progress in distinguishing them.

Quercus phellos L., Sp. Pl. 994. 1753.

***humilis* 3. foliis lanceolatis integerrimis seta terminatis subtus tomentosis.** *Quercus humilis* Walter (1788) is a later homonym of *Q. humilis* Mill. (1768), a European species. Trelease (1924) included Walter's binomial in the synonymy of the so-called running oak, which has been long referred to as *Q. pumila* Walter for which the diagnosis of *Q. humilis* is a better match than that accompanying *Q. pumila* itself. Walter's epithet "*humilis*" implies that the plant is of humble stature (i.e., a shrub) and its diagnosis stresses the tomentose lower surface of the blade while Walter's diagnosis of *Q. pumila* states that the leaves are glabrous and that the lower surface is glaucous. I cannot disprove Trelease's conviction that *Q. humilis* Walter is the species in Walter's *Flora Caroliniana* that matches the description of the running oak. However, Walter's protologue of *Q. humilis* also agrees with the stated characteristics of the species later known by the binomial *Q. incana* W. Bartram (= *Q. cinerea* Michx.), the bluejack oak, except that a tree growing to 10 meters in height, although often much smaller, would scarcely be expected to receive the epithet *humilis*. Pursh (1814, p. 625) treated the bluejack oak as *Q. phellos* β [= var.] *humilis* citing Catesby's account (1730, 1: 22. t. 22) and noted that the plant was "of low straggling growth." Linnaeus (1753) previously had cited Catesby 1: 22. t. 22 as *Q. phellos* β . Catesby's (1730) comments are included in full in the following quotation:

Quercus humilior salicis folio brevior.

The Highland Willow Oak

This is usually a small tree, having a dark coloured bark with leaves of a pale green, and shaped like those of a willow. It grows on dry poor land, producing but few acorns, and those small. Most of these oaks are growing at Mr. Fairchild's.

Catesby's description and plate (1: 22. t. 22) were identified by Ewan (1974) as *Quercus laevis* while Howard and Staples (1983) and Wilbur (1990) identified it as *Q. incana* W. Bartram.

Quercus incana W. Bartram, Travels Carolina 378. 1791.

Q. phellos β *brevifolia* Lam., *Encycl. Méth. Bot.* 1: 722. 1785.

Q. humilis Walter, *Fl. Carol.* 234. 1788, non Mill., 1768.

Q. cinerea Michx., *Hist. Chênes Amér., Quercus* no. 8. pl. 14. 1801.

***pumila* 4. foliis lanceolatis integerrimis glabris subtus glaucis.** As pointed out in the paragraph above, the Latin diagnosis of *Quercus humilis* matches the species originally proposed by Thomas Walter for what has been called for nearly the past two centuries *Q. pumila*. The diagnosis provided for *Q. pumila* by Walter describes a species whose glabrous leaves are glaucous beneath. Walter's protologue for the running oak, *Q. pumila*, strikingly conflicts with the characteristics of the plant which has borne that binomial for over two centuries. Consequently, a name change is necessary for this very distinctive and familiar dwarf oak that ranges along the coastal plain from southeastern North Carolina southward throughout peninsular Florida and westward into Mississippi. To "retypeify" *Q. pumila* Walter with a specimen in accord with "current usage" would be in serious conflict with the last three words of the otherwise decidedly uninformative protologue.

***Quercus elliotii* Wilbur, *sp. nov.*, TYPE: UNITED STATES. South Carolina: Hampton Co., pine savanna along NW margin of Piggys Rd., 1 mi. W of main office at James W. Web Wildlife Center, 4.2 mi. W of Garnett off secondary highway Rt. 20; 32.6216°N, 81.3213°W, 54 ft. elevation, 13 Oct 2000, *Nelson 21668 & Wood* (HOLOTYPE: DUKE; ISOTYPES: BKL, BRIT, CU, DLF, DUKE, F, FLAS, FSU, FTG, GA, GH, IBE, ILL, LSU, MICH, MISS, MISSA, MO, NCSC, NCU, NLU, NY, TEX, UNA, US, USCH, USE, VSC, WIS, WNC).**

Differt a *Quercus incana* W. Bartram habitu fruticoso et coloniali sobolibus, caulibus 1(-2) m altis. Fructus hornotini maturescentes, sessiles vel brevipedicelli; cupula 4-5 mm alta, crateriformis, squamis arcte appressis, cinereis, appresso-pilosis; glans (in cupula) inserta.

Shrub, commonly forming extensive clones by subterranean runners; stems 0.5-1 (-2) m tall, profusely sprouting from their bases after burning of pinelands, the leaves of sprouts often larger than those of stems unburned for several years. Woody twigs of the season grayish brown, usually much of their pubescence persisting through the first year. Winter bud or buds at the tips of twigs ovoid-conic, 3-5 mm long, brown, the scales mostly with

a fringe of minute trichomes around their apical margins. Leaves all deciduous in autumn or a few of them overwintering and falling just before or as new growth commences in spring. Stems of young shoots moderately to densely stellate-pubescent; edges of unfurling leaf blades downwardly curved and recurved covering perhaps as much as half of the lower surfaces, their upper surfaces with sparse, pale, stellate pubescence but eventually glabrescent; the lower surfaces shortly, densely, and compactly pale-gray, stellate-pubescent. Mature leaves very short-petiolate; petioles stellate-pubescent. Blades mostly 3–10 (–15) × 0.7–2 (–5) cm, oblanceolate or spatulate, narrowly elliptic, elliptic-oblong, or lanceolate, usually with a short bristle tip; bases cuneate to narrowly rounded, apices rounded to acute; upper surfaces glabrous, dark green and lustrous or sublustrous, sometimes dull green, lower surfaces densely and compactly grayish puberulent; flat and with entire margins, sometimes their edges somewhat crisped, only rarely with a few, low, rounded undulations. Fruits maturing in one season, sessile or shortly peduncled, their involucre bowl-like, 4–5 mm deep, embracing about one-third the length of the acorn, scales tightly appressed, grayish brown, broadest basally where many or most of them are humped or bulged, gradually narrowed distally to truncated, flat tips; acorns ovoid, subglobose, or somewhat oblate, 8–12 mm long and broad, basally flat, apically rounded to nearly truncate, outer surfaces light brown, glabrous or faintly and sparsely very short-pubescent near their summits, inner surfaces loosely pale-pubescent near their summits, inner surfaces loosely pale-pubescent, the trichomes blond to tawny.

It might be argued that all that was needed to rehabilitate nomenclaturally a case like that of *Quercus pumila* Walter was that a neotype be designated and published, confirming the identity of the plant in the traditional sense and thereby nullifying the questionable phrases in the original diagnosis. However the original descriptive phrases in Walter's diagnosis are exceedingly brief. If we were to ignore or delete the questionable last three words from the descriptive diagnosis of the running oak, there would remain very little that was distinctly descriptive, and those three descriptive words exclude the species to which the name has been employed.

The preceding entry (i.e., that for *Quercus humilis*; 3. foliis

lanceolatis integerrimis seta terminatis subtus tomentosis) is clearly a much better fit for what has been passing as *Q. pumila* Walter, than is the descriptive account accompanying *Q. pumila* itself. That account has been attributed to *Q. incana* W. Bartram. In any event, *Q. humilis* Walter (not *Q. humilis* Mill., 1768) is a later homonym and cannot now be applied to any species named after 1768.

Prinus 5. foliis ovatis sinuato-serratis, denticulis uniformibus. The chestnut oak naturally occurring in the coastal plain of South Carolina is *Quercus michauxii* Nutt., the swamp chestnut oak. *Quercus prinus* L. is now most often referred to as *Q. montana* Willd. Hardin (1979) recommended that the binomial *Q. prinus* be treated as an “ambiguous” name since the lectotypic specimen cannot be conclusively identified because the features displayed are not those that distinguish the two species confounded by Linnaeus (i.e., *Q. prinus* and *Q. michauxii*) under the binomial *Q. prinus*. Linnaeus’ binomial has been applied to both species (i.e., to either the chestnut oak or to the swamp chestnut oak, for lengthy periods as shown by Hardin’s table). Fortunately, for the purposes of this paper, the oak in Walter’s area can only be the bottomland swamp chestnut oak, as only that species is known from eastern South Carolina. John Fraser, however, had ample opportunity to observe both species during his extensive travels. It is to be remembered that Sargent (1916) reversed the application of the name *Q. prinus* from the mountain chestnut oak to the swamp chestnut oak nearly nine decades ago based on his belief that the mountain chestnut oak was not to be found in southeastern Virginia, the presumed “type” locality of the Clayton specimen described by Gronovius (1739). Sargent’s reversal was generally followed for several decades by American workers and especially by foresters and by E. J. Palmer (1943) whose study convinced him that Sargent was correct in applying *Q. prinus* L. to the swamp chestnut oak. However, additional floristic investigations (e.g., Fernald 1946, p. 391; Harvill et al. 1986, pp. 85–86) have demonstrated that both the swamp chestnut oak and the rock chestnut oak are to be found in southeastern Virginia in close proximity to Clayton’s home. In my opinion, the name *Q. prinus* L. has not yet been formally disposed of and the binomial needs to be either laid to rest by rejection, or epitypified and adopted. A paper proposing the first alternative will soon be sub-

mitted to *Taxon*. *Quercus michauxii* Nutt. is abundant in the bottomlands of the Santee River upon whose southern bank Walter's plantation was located.

Quercus michauxii Nutt., Gen. N. Amer. Pl. 2: 215. 1818.

Q. prinus L., Sp. Pl. 995. 1753, in part, *nom. rej. prop.*

Q. prinus [var.] *palustris* Michx., Hist. Chênes Amér., *Quercus* no. 5. pl. 6. 1801. ["*Q. Prinus (palustris) Michx.*"]

Q. prinus α *palustris* Michx., Fl. Bor.-Amer. 2: 196. 1803.

Q. prinus var. *michauxii* (Nutt.) Chapm., Fl. South. U.S. 424. 1860.

Q. houstoniana C. H. Mull., Amer. Midl. Naturalist 2: 743. fig. 1. 1942.

nigra 6. foliis obcuneiformibus obsolete trilobis villosis ramis inferioribus declinatis, superioribus adscendentibus. The advantage that familiarity with plants in the field provides to the investigator is clearly demonstrated by Walter's treatment of this species and the next (Walter's #6 and #7). Walter treated both as species while Linnaeus combined them as varieties of *Quercus nigra* L. Perhaps it would be more accurate to state that Linnaeus treated as a varietal appendage, the β variety of *Q. nigra* as the element that became *Q. marilandica*. Britten (1909) has a detailed explanation of the early travail of the two elements included by Linnaeus within his *Q. nigra*. Britten there informs us that "Walter's herbarium contains a leaf" of both *Q. nigra* and *Q. marilandica* although neither bears an identification by Walter. Walter's solution was to remove the Gronovian and Catesbian (1: 20) references as *Q. aquatica* Walter, leaving the Ray and Catesbian (1: 19) references as *Q. nigra* L. However, Walter's solution to Linnaeus' confusion in placing the water oak and the blackjack oak under the binomial *Q. nigra* was not the first remedy proposed. Münchhausen (1770, 5: 253) had named the blackjack oak, *Q. marilandica*, in effect removing the Linnaean β variety, leaving *Q. nigra* L. as the binomial for the water oak. The result was to segregate the Gronovian and Catesbian references as *Q. nigra* and leaving *Q. nigra* β exemplified by Catesby's 1: 19. t. 19 "Quercus marilandica folio trifida . . ." of Ray and Catesby as *Q. marilandica* Münchh. The species that Walter retained under the Linnaean binomial, *Q. nigra*, is now known as *Q. marilandica*.

Quercus marilandica Münchh., Hausvater 5: 253. 1770.

Q. marilandica . . . Catesby, Nat. Hist. Carol. 1: 19. t. 19. 1730.

Q. nigra [var.] β L., Sp. Pl. 2: 996. 1753.

- Q. cuneata* Wangerh., Beytr. Teut. Forstwiss. 78. 1787.
Q. ferruginea F. Michx., Hist. Arbr. Forest. 2: 92. pl. 18. 1812.
Q. nigra β *quinteloba* Alph. de Candolle, Prodr. (DC.) 16(2): 64. 1864.
Q. nigra γ *tridentata* Alph. de Candolle, Prodr. (DC.) 16(2): 64. 1864.
Q. marilandica var. *ashei* Sudw., Jour. For. (Washington) 20: 167. 1922.
Q. marilandica f. *cuneata* (Wangerh.) Trel., Mem. Natl. Acad. Sci. 20: 200. 1924.

***aquatica* 7. foliis obcuneiformibus obsolete trilobis submucronatis laevibus nitidis, subperennatibus.** As explained above, Walter divided Linnaeus' *Quercus nigra* into its two component species: *Q. nigra* was the name retained for the blackjack oak, and the water oak, fittingly enough, was named *Q. aquatica* Walter. However, Münchhausen (1770, 5: 253) had corrected Linnaeus' confusion earlier by naming the blackjack oak *Q. marilandica* Münchh., which left the binomial *Q. nigra* L. for the water oak.

Quercus nigra L., Sp. Pl. 995. 1753.

- Q. uliginosa* Wangerh., Beytr. Teut. Forstwiss. 80. 1787.
Q. aquatica Walter, Fl. Carol. 234. 1788.
Q. nana Willd., Sp. Pl., ed. 4.4(1). 443. 1805.
Q. bumeliaefolia Riddell, New Orleans Med. Surg. J. 9: 614. 1853.
Q. aquatica γ *stipitata* Alph. de Candolle, Prodr. (DC.) 16(2): 68. 1864.
Q. rhombica var. *obovatifolia* Sarg., Bot. Gaz. 65: 431. 1918.
Q. nigra var. *tridentifera* Sarg., Bot. Gaz. 65: 429. 1918.

***rubra* 8. foliis 3 s. 5 lobis obtusis subtus villosis, setaceo-mucronatis glandibus parvis globosis.** Totten (Radford et al. 1968) did not map *Quercus rubra* L. as occurring in the coastal plain of South Carolina although it was well-dispersed throughout the piedmont and mountains of that state. The same source shows it to be widely scattered and apparently rare in the coastal plain of North Carolina. Svenson (1939) and Fernald (1946), among others, have pointed out that many Linnaean species include two or more species, based on the included synonymy according to more recent systematists who have had the advantages of greater familiarity with the plants in the field and/or more extensive collections available for comparison. For example, Fernald (1946, p. 391) pointed out that in *Species Plantarum* (Linnaeus 1753), the name *Q. rubra* "covered many (if not most) of the eastern species of subgenus *Erythrobalanus* . . ." including the red oak itself. Svenson (1945) concluded "that the Linnaean species from one point of view was the synthesis of all bibliographic citations un-

der the species, together with the Linnaean herbarium specimens, whether they were associated with the citations.”

Du Roi (1772) was apparently the first to restrict the name *Quercus rubra* to a single species. That choice determined that the binomial *Q. rubra* L. thereafter should be reserved for the red oak of northeastern North America as well as covering much of eastern United States and adjacent Canada (see Nixon and Muller 1997, p. 465 for map).

However Sargent's (1915, 1916) own research and sense of propriety convinced him that “the name *Quercus rubra* belonged to the tree which was later called *Q. falcata* by Michaux and not to the tree which has always been called red oak in the northern states.” Sargent admitted that “this change of name is one of the most unfortunate which the study of old specimens of American plants has made necessary . . .” Sargent's prestige was such that many, including most foresters and followers of the American Code of Nomenclature, for the next two decades or so applied the Linnaean binomial *Q. rubra* to the southern red oak (= *Q. falcata* Michx.) whose leaves are abaxially densely and permanently tomentose beneath. Sargent seemingly attached great importance to the first synonym appearing in the Linnaean prologue, no doubt influenced by Linnaeus' own statement that the synonym with the best description should be listed first (see footnote in Svenson 1939, p. 522). Sargent was also convinced, based on insufficient field experience, that only *Q. falcata* Michx. of the *rubra*-complex was to be found in southeastern Virginia, the area in which Clayton and Banister lived and from which they sent collections to European botanists such as Gronovius and Ray. The first synonym listed by Linnaeus, as pointed out by Sargent (1915), is that of Gronovius (1739) based on a collection by John Clayton. Sargent found Clayton's specimen to be what has been called *Q. falcata* Michx. and felt that there was no alternative but to apply the name *Q. rubra* to that element of Linnaeus' multi-parted concept of *Q. rubra*. Naturally, applying the binomial *Q. rubra* L. to two very different species led to confusion, leading Rehder (1938) to propose unsuccessfully that the name be officially declared a *nomen ambiguum*. Harvill et al. (1986, p. 85–86) maps show that both the red oak and southern red oak are abundant in southeastern Virginia. Others (e.g., Svenson 1939, 1945; Fernald 1946) took strong exception to Sargent's retypification of a species first typified by Du Roi (1772).

Fortunately, for the purposes of this paper there is no problem, as Walter's descriptive polynomial is explicit for the villosity of the leaf's undersurface. He clearly was applying the name to the same element that Sargent mistakenly felt obliged to choose (i.e., the element that Michaux called *Quercus falcata*). The northern red oak has not been found in Walter's area but the southern red oak is abundant there now, as it surely was in Walter's time.

Quercus falcata Michx., Hist. Chênes Amér., *Quercus* no. 16. pl. 28. 1801.

Q. nigra digitata Marshall, Arbust. Amer. 123. 1785.

Q. triloba Michx., Hist. Chênes Amér., *Quercus* no. 14. pl. 26. 1801.

Q. elongata Willd., Ges. Naturf. Freunde Berlin Neue Schriften 3: 400. 1801; Sp. Pl., ed. 4.4(1). 444. 1805.

Q. falcata β *triloba* (Michx.) Nutt., Gen. N. Amer. Pl. (Nuttall) 2: 214. 1818.

Q. carpenterii Riddell, New Orleans Med. Surg. J. 9: 613. 1853.

Q. falcata β *ludoviciana* Alph. de Candolle, Prodr. (DC.) 16(2.1): 59. 1864.

Q. digitata (Marshall) Sudw., Gard. & Forest 5: 99. 1892.

Q. rubra var. *triloba* (Michx.) Ashe, Proc. Soc. Amer. Foresters. 11: 90. 1916. *nom. illegit.*, Art. 34.1(b).

Q. rubra var. *leucophylla* Ashe, Bull. Charleston Mus. 13: 25. 1917.

Q. pagoda var. *leucophylla* (Ashe) Ashe, J. Elisha Mitchell Sci. Soc. 34: 136. 1918.

Q. leucophylla (Ashe) Ashe, Torreyia 18: 73. 1918.

Q. rubra sensu Sarg., Bot. Gaz. 65: 426. 1918.

Q. rubra var. *triloba* (Michx.) Sarg., Bot. Gaz. 65: 427. 1918.

Q. joori Trel., Mem. Natl. Acad. Sci. 20: 15. 1924.

Q. rubra f. *triloba* (Michx.) Trel., Mem. Natl. Acad. Sci. 20: 201. pl. 406, fig 3. 1924.

Q. rubra f. *falcata* (Michx.) Trel., Mem. Natl. Acad. Sci. 20: 202. pl. 406, fig. 2. 1924.

Q. rubra var. *triloba* (Michx.) Sudw., Check List For. Trees U.S. 89. 1927.

Q. rubra var. *leucophylla* (Ashe) Sudw., Check List For. Trees U.S. 90. 1927.

Q. rubra var. *digitata* (Marshall) Cory & Parks, Cat. Fl. Tex. 37. 1937.

***laevis* 9. foliis obtuse sinuatis laevibus setaceo-mucronatis, glandibus magnis depresso globosis calyce subtectis.** The synonymy of the turkey oak is as follows:

Quercus laevis Walter, Fl. Carol. 234. 1788.

Q. Catesbaei Michx., Hist. Chênes Amér., *Quercus* no. 17. pl. 29–30. 1801.

Q. flammula W. Bartram, Travels Carolina 228, 344, 359, 403, 470. 1791, *nom. nud.*

alba 10. foliis pinnatifidis laevibus, lobis finis subaequantibus, supra saturate viridibus subtus glaucis, glandibus magnis ovatis. There seems to be no doubt that Walter's concept of the white oak, *Quercus alba* was also that of Linnaeus. This species is abundant about Walter's former plantation.

Quercus alba L., Sp. Pl. 996. 1753.

Q. alba frutescens Münchh., Hausvater 5: 253. 1770.

Q. alba α *pinnatifida* Michx., Hist. Chênes Amér., *Quercus* no. 4. pl. 5, fig. 1. 1801.

Q. alba β *repanda* Michx., Hist. Chênes Amér., *Quercus* no. 4. pl. 5, fig. 3. 1801.

Q. alba var. *latiloba* Sarg., Bot. Gaz. 65: 435. 1918.

lyrata 11. foliis lyratis laevibus sinibus obtusissimis lobis remotis inaequalibus, glandibus magnis globosis subtectis. Again, no controversy has yet surrounded the identity of the overcup oak first named and described by Walter.

Quercus lyrata Walter, Fl. Carol. 235. 1788.

Scolodrys lyrata (Walter) Raf., Alsogr. Amer. 29. 1838.

sinuata 12. foliis sinuatis laevibus obtusis supra pallidis, subtus subglaucis, glandibus mediocribus globosis calyce subplano. Contrary to the lack of debate concerning the identity of such species as *Quercus alba* and *Q. lyrata*, there has been much uncertainty about the identity of *Q. sinuata* Walter. This uncertainty is not lessened by the lack of original material among Walter's specimens at BM [so reported by Sargent (1918, p. 436) and by Nixon and Muller (1997, p. 497)]. Prior to Camus' (1939, 2: 678), Muller's (1951), and Dorr and Nixon's (1985) acceptances of *Q. durandii* Buckley as a synonym of *Q. sinuata* Walter, there had been a slowly growing consensus that this was the proper disposition of Buckley's binomial (see Elias 1971, p. 183). However, I find that the considerable uncertainty as to the identity of Walter's *Q. sinuata* prevents me from joining that growing consensus.

Original specimens representing Thomas Walter's oak collections are unknown and hence their interpretation must depend upon their original descriptions. Walter's descriptions, in the judg-

ment of W. W. Ashe (1916) are "excellent" in spite of their brevity, but "each . . . must be considered in connection with the others he describes." The description of *Quercus sinuata* has proven to be most problematic. Both Engelmann (1876, p. 400) and Sargent (1895, p. 144) concluded that *Q. sinuata* was the hybrid of *Q. catesbaei* (= *Q. laevis*) \times *Q. nigra*. Ashe (1916) challenged this interpretation since the hybrid has a deep acorn cup with a rounded base and not the saucer-shaped cup with a nearly flat base described by Walter, and also foliage that "is dark green and lucid above and not pale [and] is bright green below and not sub-glaucous." Ashe at first unfortunately confused *Q. austrina* Small (1903) with Walter's *Q. sinuata*, overlooking the fact that Small's species was described as having both leaf surfaces bright green and with an acorn cup hemispheric in contrast to the flattened cup described by Walter for *Q. sinuata*. Ashe (1918, p. 11) unobtrusively admitted his error in placing *Q. austrina* in the synonymy of *Q. sinuata* and made thereafter no further pronouncements on the identity of *Q. sinuata*. Trelease (1924, p. 101) however, apparently unaware of Ashe's retraction, followed Ashe's earlier opinion in combining *Q. sinuata* and *Q. austrina*. Unfortunately Trelease paid little or no attention to Walter's description as he separated *Q. sinuata* f. *sinuata* from f. *durandii* (Buckley) Trelease by the former's green lower leaf surface in contrast to the pale lower surface of the latter.

Palmer (1945) thought Engelmann's conclusion (1876–1877) that *Quercus sinuata* Walter was a hybrid between *Q. laevis* and *Q. nigra* was "a more reasonable interpretation" than Ashe's earlier (1916) conclusion that *Q. austrina* Small was a later synonym of *Q. sinuata*. Both Trelease (1924) and Muller (1951) accepted the earlier opinion of Ashe (1916) that *Q. sinuata* was an earlier name for *Q. durandii*. This conclusion was firmly rejected by Ashe (1918). Palmer concluded that *Q. sinuata* had indeed been mistakenly identified as synonymous with *Q. austrina* Small by Ashe, as Ashe (1918) himself had admitted in an obscure retraction. In his detailed study of the *Q. durandii* complex, a group restricted in his opinion to the calciphilic soils of the Gulf coastal plain and east Texas, Palmer (1945) maintained that synonymization with *Q. sinuata* was clearly unwarranted since *Q. durandii* is not known in Walter's region, and in no character except possibly in the shape of the leaves could Walter's description be reconciled with *Q. durandii*. Palmer felt so strongly about the

matter that he claimed that “until a specimen named by Walter can be seen the name must remain doubtful.” Palmer treated *Q. sinuata* as a *nomen dubium*.

Muller (1951), ignoring or at least making no reference to Palmer's paper, took up *Quercus sinuata* Walter, including in its synonymy both *Q. austrina* Small and *Q. durandii* Buckley, feeling that “arguements against identity of this plant with Walter's name include the inability of contemporary collectors to find the species in Walter's immediate territory, which is distinctly inconclusive.” Walter's description of *Q. sinuata* leaves as “subtus subglaucis” and the fruit as “mediocribus globosis calyce subplano” indeed excludes other southeastern oaks and agrees perfectly with the form with silvery lower leaf surfaces that Buckley named *Q. durandii*. [One can't help but point out that Buckley's only mention of surface features in the original description was “when mature, smooth on both sides,” which offers little support to Muller's own description (1951) of the species he called *Q. sinuata* (including in synonymy *Q. durandii* and *Q. austrina*): “upper surfaces from sparsely minute-stellate becoming glabrate and glossy dark green, lower surfaces persistently pubescent with minute appressed dense stellate hairs strikingly silver or appearing green if the pubescence is sparse, occasionally tardily glabrate . . .”] Later, Nixon and Muller (1997) recognized *Q. austrina* as a species separate from *Q. sinuata*, but only after Dorr and Nixon (1985) accepted Ashe's (1916) submergence of the two species (i.e., *Q. austrina* within *Q. sinuata*), making no mention of Ashe's retraction (1918). Nixon and Muller (1997, p. 498) stated that “the original description of *Q. sinuata* is consistent with the concept presented . . . by W. W. Ashe (1916) and W. Trelease (1924), and inconsistent with any other oak from the broad area covered by Thomas Walter's *Flora* . . .”

This review of the pertinent literature is not one that gives confidence that enough is known about the identity of the types, the morphological limits of the species involved, or their geographic ranges, etc., to be dogmatic as to the application of the binomials of these little known taxa. The application of the binomial *Quercus sinuata* Walter is too uncertain, in my opinion, to be adopted at the present time; it very much remains a *nomen dubium*. More field work and observation are very much needed for many of the southeastern oaks.

***villosa* 13. foliis obtuse lobatis, supra nitidis subtus villosis glandibus parvis globosis.** Although neither Michaux (1803) nor Pursh (1814) placed Walter's *Quercus villosa* in synonymy of any species in their early floras of North America, later authors have rather unanimously identified *Q. villosa* Walter as a synonym of the earlier *Q. stellata* Wangenh. This post oak is common in Walter's area as well as much of the eastern United States. There is little in Walter's diagnosis that would have convinced me that the plant described was the post oak, but there is nothing that would cause me to question the identity except that the descriptor "villose" would not have occurred to me as describing the very familiar *Q. stellata*. The pubescence on the stem and leaves of the post oak, in my experience scarcely qualifies as being villose.

Quercus stellata Wangenh., Beytr. Teut. Forstwiss. 78. pl. 6, fig. 15. 1787.

Q. alba minor Marshall, Arbust. Am. 120. 1785.

Q. villosa Walter, Fl. Carol. 235. 1788.

Q. lobulata Sol. in Smith & Abbot, Insects of Ga. 1: 93. pl. 47. 1797.

Q. obtusiloba Michx., Hist. Chênes Amér. pl. 1. 1801.

Q. stellata β *floridana* Alph. de Candolle, Prodr. (DC.) 16(2): 24. 1864.

Q. minor (Marshall) Sarg., Gard. & Forest 2: 471. 1889.

Q. stellata var. *parviloba* Sarg., Bot. Gaz. 65: 438. 1918.

Q. ashei Sterrett, J. Elisha Mitchell Sci. Soc. 37: 178. 1922.

Q. similis Ashe, J. Elisha Mitchell Sci. Soc. 40: 43. 1924.

Q. stellata var. *similis* (Ashe) Sudw., U.S.D.A. Misc. Circ. 92: 107. 1927.

LITERATURE CITED

- ASHE, W. W. 1916. Notes on Trees. Bull. Charleston Mus. 14: 9–12.
 ———. 1918. Notes on Trees. Proc. Soc. Amer. Foresters 11: 88–90.
 BRITTEN, J. 1909. *Quercus nigra*. J. Bot., British & Foreign 47: 349–350.
 CAMUS, A. A. 1934–1954. Les Chênes. Monographie du genre *Quercus*, Vol. 2. Paul Lechevalier, Paris. [2: 678]
 CATESBY, M. 1730–1742. The Natural History of the Carolinas, Florida and the Bahama Islands. 2 vols. Folio. London, U.K.
 DORR, L. J. AND K. C. NIXON. 1985. Typification of the oak (*Quercus*) taxa described by S. B. Buckley (1809–1884). Taxon 34: 211–228.
 DU ROI, J. P. 1772. Harbkesche Wilde Baumzucht Theils Nordamerikanischer . . . , 1st ed. Warsenhaus Büchhandlung, Braunschweig, Germany. [p. 265]
 ELIAS, T. S. 1971. The genera of Fagaceae in the southeastern United States. J. Arnold Arbor. 52: 152–195.
 ENGELMANN, G. 1876–1877. About the Oaks of the United States. Proc. St. Louis Acad. Sci. 3: 372–400, 539–541.

- EWAN, J. 1974. Notes, pp. 89–100. *In*: The Natural History of Carolina, Florida and the Bahama Islands, containing two hundred and twenty figures of birds, beasts, fishes, serpents, insects, and plants, by M. Catesby. Facsimile of the 3rd. ed. (1771). Beehive Press, Savannah, GA.
- FERNALD, M. L. 1946. Types of some American trees. *J. Arnold Arbor.* 27: 386–394. [pl. 1–3]
- FRASER, J. 1789. A short history of the *Agrostis cornucopiae* or the new American grass and also some account of a journey to the Cherokee Nation, in search of new plants. 8 page folio. London, U.K.
- GRONOVIVS, J. F. 1739 & 1743. *Flora Virginica Exhibens Plantas quas V. C. Johannes Clayton in Virginia observavit atque collegit.* 2 parts. Leiden, Netherlands.
- HARDIN, J. W. 1979. *Quercus Prinus* L.—*nomen ambiguum*. *Taxon* 28: 355–357.
- HARPER, R. M. 1911. Early spring aspects of the coastal plain vegetation of South Carolina, Georgia, and northeastern Florida. *Bull. Torrey Bot. Club.* 39: 223–238. [*n.b.* footnote on p. 232]
- HARVILL, A. M., JR., T. R. BRADLEY, C. E. STEVENS, T. F. WIEBOLDT, D. M. E. WARE, AND D.W. OGLE. 1986. *Atlas of the Virginia Flora*, 2nd ed. Virginia Botanical Associates, Farmville, VA. [*Quercus*, pp. 85–86]
- HOWARD, R. A. AND G. W. STAPLES. 1983. The modern names for Catesby's plants. *J. Arnold Arbor.* 26: 482–483.
- LINNAEUS, C. VON. 1753. *Species Plantarum*, Vol. 2. Stockholm. [*Quercus*, 2: 994–997]
- MICHAUX, A. 1803. *Flora Boreali-Americana* (Michaux), Vol. 2. Paris and Strasbourg. [*Quercus*, 2: 194–200]
- MULLER, C. H. 1951. *The Oaks of Texas*. *Contr. Texas Res. Foundation*, Renner, TX. [1: 20–311]
- MÜNCHHAUSEN, O. VON. 1765–1773. *Der Hausvater*. 6 vols. Hannover, Germany.
- NIXON, K. C. AND C. H. MULLER. 1997. *Quercus* L. sect. *Quercus*, pp. 471–506. *In*: *Flora of North America* Editorial Committee, eds., *Flora of North America North of Mexico*, Vol. 3. Oxford Univ. Press, Oxford and New York.
- PALMER, E. J. 1943. *Quercus Prinus* Linnaeus. *Amer. Midl. Naturalist* 29: 783–784.
- . 1945. *Quercus Durandii* and its allies. *Amer. Midl. Naturalist* 33: 514–519.
- PURSH, F. T. 1814. *Flora Americae Septentrionalis; or, a Systematic Arrangement and Description of the Plants of North America*, Vol. 2. London, U.K. [*Quercus*, 2: 625–634]
- RADFORD, A. E., H. E. AHLES, AND C. R. BELL. 1968. *Manual of the Vascular Flora of the Carolinas*. Univ. North Carolina Press, Chapel Hill, NC. [*Quercus*, pp. 372–385]
- REHDER, A., E. J. PALMER, AND L. CROIZAT. 1938. Seven binomials proposed as *nomina ambigua*. *J. Arnold Arbor.* 19: 282–285. [*Quercus rubra* L., pp. 283–284]
- REMBERT, D. H., JR. 1980. Thomas Walter, Carolina botanist. *Bull. No. 5*, South Carolina Museum Commission, Columbia, SC.

- ROCK, H. F. L. 1956. The binomials of *Helenium* in Walter's *Flora Caroliniana*. *Rhodora* 58: 311–317.
- SARGENT, C. S. 1895. *The Silva of North America*, Vol. 8. Houghton Mifflin and Co., Boston and New York.
- . 1915. Three of Clayton's oaks in the British Museum. *Rhodora* 17: 39–40.
- . 1916. The name of the red oak. *Rhodora* 18: 45–46.
- . 1918. Notes on North American trees. *Bot. Gaz.* 65: 423–459.
- SMALL, J. K. 1903. *Flora of the Southeastern United States*. Published by the author, New York. [*Quercus*, pp. 348–355]
- SVENSON, H. K. 1939. *Quercus rubra* once more. *Rhodora* 41: 521–524.
- . 1945. On the descriptive method of Linnaeus. *Rhodora* 47: 273–302, 363–388.
- TRELEASE, W. 1924. The American Oaks. *Mem. Natl. Acad. Sci.* 20: 1–255.
- WALTER, T. 1788. *Flora Caroliniana*. Privately published by John Fraser, London, U.K. [*Quercus*, pp. 234–235]
- WILBUR, R. L. 1990. Identification of the plants illustrated and described in Catesby's *Natural History of the Carolinas, Florida and the Bahamas*. *Sida* 14: 29–48.